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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,037	11/17/2003	Nicholas John Doran	048462-5003-01	1140

22903 7590 01/25/2007  
COOLEY GODWARD KRONISH LLP  
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EXAMINER
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LEE, DAVID J

ART UNIT	PAPER NUMBER
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2613

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/25/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/713,037

Applicant(s)

DORAN ET AL.

Examiner

David Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 December 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 and 39 is/are pending in the application.
- 4a) Of the above claim(s) 33-37, 39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of claims 1-32 (Group 1) in the reply filed on 12/13/2006 is acknowledged.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Ishikawa et al. (US Patent No. 5,717,510).

Regarding claims 1 and 2, Ishikawa teaches a method of communicating using optical pulses comprising: launching the optical pulses into an optical fiber communication system including a plurality of sections having dispersion of opposite sign (see fig. 42; col. 6, lines 14-18), the pulses being launched at a wavelength at which the system has normal average dispersion (see col. 10, lines 54-57; see also col. 17, lines 53-56), no amplifier being disposed between a first pair of adjacent sections from the plurality of sections and a second pair of adjacent sections from the plurality of sections (see fig. 42: no amplifier is disposed), the first pair of adjacent sections being mutually exclusive from the second pair of adjacent sections (the pairs are mutually exclusive – i.e., they do not overlap).

4. Claims 1-3, 6-9, 12, 13, 15, 18, 21-24, 27, 28, and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Bhagavatula et al. (US Patent No. 5,887,105).

Regarding claims 1 and 2, Bhagavatula teaches a method of communicating using optical pulses comprising: launching the optical pulses into an optical fiber communication system including a plurality of sections having dispersion of opposite sign (see fig. 1 – note that each dispersion value  $D$  per unit length alternates in positive or negative dispersion values; see also e.g., col. 7, lines 27-32), the pulses being launched at a wavelength at which the system has normal average dispersion (see col. 3, lines 16-20: the “near zero” dispersion is understood as “normal average” dispersion), no amplifier being disposed between a first pair of adjacent sections from the plurality of sections and a second pair of adjacent sections from the plurality of sections (no amplifiers are disposed between the pairs), the first pair of adjacent sections being mutually exclusive from the second pair of adjacent sections (the sections are mutually exclusive – i.e., they do not overlap).

Regarding claims 3 and 18, Bhagavatula teaches a method of communication using optical pulses, the method comprising: transmitting the optical pulses over a dispersion-managed optical fiber communication system including a first section having a dispersion, a second section having a dispersion of opposite sign from the dispersion of the first section, a third section having a dispersion and a fourth section having a dispersion of opposite sign from the dispersion of the third section (see fig. 1 – note that each dispersion value  $D$  per unit length alternates in positive or negative dispersion; see also e.g., col. 7, lines 27-32), the second section being disposed between the first section and the third section without an intervening amplifier

(no amplifier is disposed between the first and third section), at least some pulses being transmitted at a wavelength at which the system exhibits normal average dispersion (see col. 3, lines 16-20: the “near zero” dispersion is understood as “normal average” dispersion), the first pair of adjacent sections being mutually exclusive from the second pair of adjacent sections (the sections are mutually exclusive – i.e., they do not overlap).

Regarding claims 6 and 21, Bhagavatula teaches that the communication system is dispersion managed using sections of fiber having anomalous dispersion (see e.g., anomalous section 4 of fig. 1).

Regarding claims 7 and 22, Bhagavatula teaches that the communication system is dispersion managed using sections of SSMF fiber and section of DCF fiber (see col. 1, lines 53-55 and col. 7, lines 11-12).

Regarding claims 8 and 23, Bhagavatula teaches that the communication system is dispersion managed using alternative sections of fiber having opposite signs of dispersion (see fig. 1).

Regarding claims 9 and 24, Bhagavatula teaches that the communication system is managed using dispersion compensating elements (see col. 1, lines 53-55).

Regarding claims 12 and 27, Bhagavatula teaches that the communication system is managed using linear elements (see col. 1, lines 53-55: the DCF is a linear element).

Regarding claims 13 and 28, Bhagavatula teaches that the communication system is a WDM system (col. 4, line 63).

Regarding claims 15 and 30, Bhagavatula teaches that the communication system has an asymmetric dispersion map (see fig. 2).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4, 14, 17, 19, 29, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhagavatula in view of Golovchenko et al. (US Patent No. 6,243,181 B1).

Regarding claims 4, 14, 19, and 29, Bhagavatula teaches the limitations of claims 3 and 18 but does not expressly disclose that the system is soliton-based. However, soliton-based communication systems are notoriously well known in the art. For example, Golovchenko from a similar field of endeavor, teaches a method of communicating using optical pulses comprising launching the optical pulses into an optical fiber communication system including a plurality of sections having dispersion of opposite sign (see fig. 2), wherein the system is soliton-based (see Abstract). It would have been obvious to a skilled artisan at the time of invention to incorporate soliton functionality in the system of Bhagavatula in order to improve system performance.

Regarding claims 17 and 32, Bhagavatula teaches the limitations of claims 3 and 18 but does not expressly state that the communication system launches the pulses with a pulse shape determined according to a dispersion map of the communication system. However, a skilled artisan would have clearly recognized that pulses need to be shaped according to specific attributes of the system in order to sufficiently allow for communication. Furthermore, Golovchenko from a similar field of endeavor, teaches a system wherein the pulses are launched

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with a pulse shape determined according to a dispersion map of the communication system (see Abstract; see also col. 5, lines 1-10, lines 46-65, and col. 6, lines 3-5: note that the pulse shape is normalized to the intensity of an average soliton in the transmission line). If not inherent, it would have been obvious to a skilled artisan at the time of invention to launch pulses with a pulse shape determined according to a dispersion map in order to allow for proper and effective communication.

7. Claims 5 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhagavatula in view of Suzuki et al. (US Patent No. 6,005,702).

Regarding claims 5 and 20, Bhagavatula teaches all the limitations as applied to claims 3 and 18, but does not expressly disclose that the pulses are RZ phase modulated. Suzuki teaches that a system wherein the pulses are phase modulated return-to-zero when launched (fig. 6, 31A and 33A). It would have been obvious to a skilled artisan at the time of invention to phase modulate the pulses as indicated by Suzuki in the system of Bhagavatula in order to increase transmission performance and offset the deleterious effects from nonlinearities in the fiber transmission line.

8. Claims 10, 11, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhagavatula.

Regarding claims 10, 11, 25, and 26, Bhagavatula teaches limitations as applied to claim 3 above except for the limitation that the communication system uses circulators and is dispersion managed using optical gratings. Examiner takes official notice that dispersion

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managed systems using optical gratings and an optical circulator is well known and widely used in the art. One of ordinary skill in the art at the time of invention would have been motivated to use an optical grating and an optical circulator in the system of Bhagavatula to compensate for nonlinear effects and to achieve higher quality compressed pulses. Furthermore, it is well known that optical circulators and gratings provide increased system versatility for directing and administering signals. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to include a grating and a circulator in the system of Bhagavatula.

9. Claims 16 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bhagavatula in view of Ishikawa et al. (US Patent No. 5,717,510).

Regarding claims 16 and 31, Bhagavatula teaches all the limitations as applied to claims 3 and 18 except for the limitation that the pulses are prechirped. Ishikawa discloses prechirping pulses (col. 18, lines 18-23). One of ordinary skill in the art would have been motivated to prechirp the pulses in order to elongate signal duration, to improve communication quality, and to improve the signal to noise ratio. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to prechirp the pulses as indicated by Ishikawa in the system of Bhagavatula.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday.



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



David Lee  
Patent Examiner



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PRIMARY EXAMINER